8.12 Hazardous Materials Handling

This section reviews the hazardous materials that would be handled, used, and stored at the Tracy Peaker Project (TPP). It also discusses the procedures and engineering controls to be used to minimize potential environmental impacts from the onsite handling, storage, and use of these materials.

The TPP would use one substance designated by federal law as acutely hazardous, aqueous ammonia, to control emissions of nitrogen oxides (NO_x). This section provides information on a potential accidental release of aqueous ammonia, the impacts of a release, and proposed mitigation measures.

8.12.1 Laws, Ordinances, Regulations, and Standards

The following section describes the laws, ordinances, regulations, and standards (LORS) that are applicable to the storage and handling of hazardous materials at the TPP. The TPP would comply with all applicable LORS regarding hazardous materials handling. A summary table of applicable LORS is provided at the end of this section (Table 8.12-10).

8.12.1.1 Federal LORS

Hazardous substances are governed in part by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and the Superfund Amendments and Reauthorization Act (SARA) of 1986. Additional information on these laws and implementing regulations is provided below:

- SARA Title III, also known as the Emergency Planning and Community Right-to-Know Act (EPCRA), establishes reporting requirements for businesses and facilities that store, handle, or produce significant quantities of hazardous substances. EPCRA also requires states to establish a system to inform federal, state, and local authorities of any such substances stored or handled by the regulated community.

- Title 40 of the Code of Federal Regulations (CFR), Part 302, implements the CERCLA hazardous materials release requirements and identifies hazardous substances, reportable quantities (RQs) and notification requirements. The National Response Center (NRC) in Washington, D.C. must be notified in

case of an accidental release of a hazardous substance in excess of an RQ. CERCLA-listed hazardous substances and RQs are listed in 40 CFR 302.4.

- 40 CFR Part 355 codifies the EPRCRA planning requirements and establishes the list of Extremely Hazardous Substances (EHSs), threshold planning quantities (TPQs), and emergency response planning requirements.

- 29 CFR Part 1910 et seq. includes standards set by the Occupational Safety and Health Administration (OSHA) regarding the storing and handling hazardous materials. It also identifies equipment for protecting workers who handle hazardous materials and requirements for general facility safety. In general, California regulations pertaining to industrial relations (Title 8 of the California Code of Regulations [CCR]) are more stringent than those established by 29 CFR 1910.

Hazardous substances are also governed in part by the Clean Air Act (CAA).

- 40 CFR Part 68, Chemical Accident Prevention Provisions, identifies regulated substances, threshold quantities (TQs), and requirements for preventing accidental releases of these substances. A Risk Management Plan (RMP) is required for any processes involving regulated substances in excess of the respective TQ. Aqueous ammonia is a listed toxic substance and has a TQ of 20,000 pounds when stored at a concentration greater than 20 percent by weight. An RMP is due when the regulated toxic substance is first introduced to the process.

Hazardous substances are also governed in part by the Clean Water Act (CWA).

- 40 CFR 112 identifies facilities required to prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan. Regulated facilities are those that store oil in aboveground oil tanks with a capacity greater than 660 gallons for individual tanks or 1,320 gallons for more than one tank. Facilities with an underground oil storage capacity greater than 42,000 gallons also must comply with the SPCC requirements. The SPCC program is designed to prevent discharge of oil into navigable waters.

8.12.1.2 State/Regional LORS

- California's version of the federal Community Right-to-Know law is set forth in Chapter 6.95 of the California Health and Safety Code, Article 1, the Hazardous Materials Release Response Plans and Inventory. This law requires emergency response plans for facilities storing hazardous materials in excess of 55 gallons, 500 pounds, or 200 cubic feet. Facilities that handle more than these quantities of hazardous materials must submit a Hazardous

Materials Business Plan (HMBP) to the Certified Uniform Program Agency (CUPA).

- The California Accidental Release Prevention (CalARP) Program requires facilities handling regulated substances in a process in quantities greater than the applicable threshold quantity to prepare an RMP as described in Title 19 CCR Division 2, Chapter 4.5. Aqueous ammonia is regulated under CalARP when 500 pounds or more are stored on site.

- The State Water Resources Control Board administers the Aboveground Petroleum Storage Tank Program in accordance with Section 25270 of the California Health and Safety Code. Tanks must be registered with this agency. The Regional Water Quality Control Board ensures compliance with the program through inspections of tanks and review of the facility's SPCC Plan.

- Title 8 of the CCR addresses the control of hazardous substances. Section 5189 of Title 8 sets forth the Process Safety Management (PSM) standard for processes involving a highly hazardous chemical in excess of certain quantities. Aqueous ammonia (greater than 44 percent by weight) is regulated under this program when a process use is equal to or greater than 15,000 pounds. PSM requires a process hazard analysis, current safety information, an employee participation program, written operating procedures, a mechanical integrity program, and other procedures.

- Section 5194, Hazard Communication, requires that employers evaluate the potential hazards of chemicals handled at their workplace and share this information with their employees.

- California Vehicle Code Section 32100.5 requires specific regulations regarding materials that may pose an inhalation hazard.

8.12.1.3 Local LORS

The San Joaquin County Department of Environmental Health (DEH) is the CUPA with responsibility for the following programs pertaining to hazardous materials (the San Joaquin County Office of Emergency Services manages these programs for the DEH):

- Business Plan

- CalARP/RMP

- Underground storage tanks

- Hazardous waste
- SPCC Plan

8.12.1.4 Codes

The design, construction, operation, and maintenance of all hazardous materials storage and delivery systems will be in accordance with all applicable codes and regulations. Some of these codes and their applicability are listed below:

- State Building Standard Code – incorporates the Uniform Building Code, Uniform Fire Code, Uniform Mechanical Code and the Uniform Plumbing Code
- Uniform Fire Code, Article 80 – Hazardous Materials Section
- California Vehicle Code – includes licensing requirements for hazardous materials haulers

8.12.2 Affected Environment

GWF Energy LLC proposes to build and operate the Tracy Peaker Project (TPP), a nominal 169-megawatt (MW) simple-cycle power plant, on a nine-acre, fenced site within a 40-acre parcel in an unincorporated portion of San Joaquin County. The site is located immediately southwest of Tracy, California, and approximately 20 miles southwest of Stockton, California. The TPP would consist of the power plant, an onsite 230-kilovolt (kV) switchyard, an approximately five-mile, 230-kV electric transmission line, an approximately 1,470-foot water supply pipeline (as measured from the fence line), an onsite natural gas supply interconnection, and improvements to an existing dirt access road approximately one mile in length. An approximately 5.2-acre area west of the plant fence line and within the 40-acre parcel would be used for construction laydown and parking. Figure 2-1 shows the regional location of the GWF site. Figure 2-2 shows the immediate site location of the GWF project, including the location of the proposed generating facility and the proposed transmission, water supply, and access routes.

Major components of the proposed power plant include two GE Frame 7EA combustion turbines and an onsite 230-kV switchyard. The combustion turbines would be

equipped with inlet air filtration, evaporative cooling, and a standard acoustical enclosure. Each turbine exhaust would be equipped with dry low NO_x combustors that are guaranteed to achieve 5.0 parts per million (ppm) NO_x at 15 percent oxygen (O_2) dry. An oxidation catalyst for control of carbon monoxide (CO) and volatile organic compounds (VOC) would be installed on the exhaust. An aqueous-ammonia-type selective catalytic reduction (SCR) and oxidation catalyst system would be used for NO_x control to conform to the California Air Resources Control Board (CARB) Best Available Control Technology (BACT) guidelines of 5 ppm NO_x and 4 ppm CO.

Land use in the surrounding area is primarily industrial or agricultural, with a few residences in the general vicinity. Land use in the area is discussed in more detail in Section 8.4 of this AFC.

The nearest public receptors are workers, residences, or the two neighboring businesses. The nearest residences are approximately 0.4 miles due west, 0.8 miles southeast, and 0.8 miles east along Lammers Road. The nearest business is the Owens-Brockway glass container manufacturing facility, which is due north of the site across the Union (Southern) Pacific Railroad. The Nutting-Rice warehouse is adjacent to the Owens-Brockway plant. There are no other sensitive receptors within a one-mile radius of the proposed plant site.

8.12.2.1 Flooding Concerns

There are no permanent natural bodies of water near the TPP site. There are two water conveyance canals near the site. The Delta-Mendota Canal is adjacent to the site's southwest boundary, and the California Aqueduct is approximately 0.5 miles southwest of the Delta-Mendota Canal. Flood hazard maps for the site show that the project area is located outside of the 100-year floodplain and is not subject to flooding.

The average yearly rainfall measured at the Tracy Carbona weather station is approximately 10 inches. The average monthly precipitation for the area and the hydrology of the site are discussed in more detail in Section 8.14 (Water Resources) of this AFC. Hazardous materials storage areas will be designed to withstand weather impacts, in accordance with Article 80 of the Uniform Fire Code.

8.12.2.2 Seismic Concerns

There are approximately 10 identified fault zones within 62 miles (100 kilometers) of the project. There are no fault zones identified under the property. The closest mapped fault to the site is the Black Butte fault, about a mile to the southwest. The site is located within Seismic Zone 4.

The TPP would be built in accordance with the California Building Code Seismic Zone 4 requirements. The aqueous ammonia tank would be designed and installed in accordance with seismic and other criteria in Article 80 of the Uniform Fire Code. Additional information on seismic and geologic issues is provided in Section 8.15 (Geologic Resources) of this AFC.

8.12.3 Potential Environmental and Human Health Effects

This section reviews the hazardous materials that would be used and stored on site during the construction and operations and maintenance phases of the TPP. All hazardous and acutely hazardous substances would be stored and handled according to all the applicable LORS.

8.12.3.1 Hazardous Materials Used in the Construction Phase

During the construction phase of the TPP, the following hazardous materials will be used: gasoline, diesel fuel, motor oil, hydraulic fluid, glycol, lubricants, solvents, cleaners, sealers, paints, and paint thinner. Information on the storage quantities, storage types, uses, and hazards of these materials is shown in Table 8.12-1.

The potential for environmental and human health affects associated with these hazardous materials is minimal, as storage quantities would be minimized. The most likely incident involving hazardous materials during construction is a small spill or release of fuels, glycol, solvents, paints, or lubricants. The potential for adverse health effects would be avoided by quickly cleaning up any spill that occurs and ensuring that workers are adequately trained to recognize the hazards associated with such spills. A more serious incident could involve a service or refueling vehicle. The proper use of safety procedures and the spill prevention plan should prevent such incidents.

In case of an accident, the City of Tracy Fire Department would be notified as the first responder. All other federal, state, and local notification requirements will be followed for any release that exceeds the reportable quantity or threatens to have a significant impact. The TPP will comply with all transportation requirements for hazardous materials on state highways.

In summary, due to the small quantities of hazardous materials that would be used during construction, no adverse environmental or human health impacts are anticipated.

8.12.3.2 Hazardous Materials Used in the Operations and Maintenance Phase

A variety of hazardous materials in small volumes and one extremely hazardous substance would be used and/or stored on site during operation of the TPP. These hazardous materials are listed in Table 8.12-2 along with information on categories of each hazardous material and other information. The locations of some of these hazardous materials are shown in Figure 8.12-1. Table 8.12-3 shows the associated hazard(s) for each hazardous material.

The hazardous materials that would be used during the operations and maintenance phase are typical of those used at other industrial facilities and include oils, solvents, and other products. All hazardous materials would be handled and stored in accordance with applicable codes and regulations. Incompatible materials would be stored in separate storage containment areas. Areas susceptible to potential leaks and/or spills would be paved and bermed or otherwise secondarily contained. Piping and tanks would be protected from potential traffic hazards by concrete or other barriers. The TPP would comply with all requirements for transportation of hazardous materials on state highways.

Additional information on the hazardous substances that are regulated under the CalARP program is provided in the following section.

8.12.3.3 Acutely Hazardous Substances Used in Operation of the Project

The proposed TPP would use a 29.5 percent aqueous ammonia solution for reduction of NO_x emissions. The aqueous ammonia would be stored in a double-walled, 9,000-gallon tank. The integral double wall would contain leaks from the primary tank, should any occur.

Aqueous ammonia storage and handling facilities are equipped with continuous tank level monitors, temperature monitors, and excess flow and emergency block valves.

Aqueous ammonia would be delivered in tank trucks that have a capacity of approximately 6,700 gallons. An underground secondary containment tank beneath the tank truck-unloading pad is provided. In the event of an inadvertent release from a tank truck, the liquid contents of the entire truck plus an allowance for wash water would be contained. The unloading pad drain line to the underground secondary containment tank would normally be blocked, except during unloading operations to prevent rainwater from collecting in the tank.

The aqueous ammonia system pump station would also have a spill-containment drain to the secondary containment tank.

A piping and instrumentation diagram (P&ID) for the aqueous ammonia process is shown in Figure 8.12-2. The thresholds adopted for aqueous ammonia are listed below:

Program	Agency	Threshold Quantity (lb)
CalARP Program[1]	OES/AA	500
RMP	U.S. EPA	20,000

[1] Cal/ARP-regulated substances were called "Acutely Hazardous Materials" under the former Risk Management and Prevention Program (RMPP).

AA = administering agency
CalARP = California Accidental Release Prevention
lb = pounds
OES = Office of Emergency Services
RMP = Risk Management Plan
U.S. EPA = U.S. Environmental Protection Agency

Although ammonia poses numerous physical and health hazards, as explained below, a 29.5 percent aqueous ammonia solution is a much safer alternative than anhydrous ammonia.

Physical Hazards of Ammonia. Aqueous ammonia is stored and transported as a liquid under ambient temperature and pressure. Ammonia is incompatible or reactive with the following: strong oxidizers, acids, halogens, and silver and zinc salts. It is also corrosive to copper and galvanized surfaces. Ammonia vapor is generally regarded as nonflammable; however, it can burn. Under certain conditions, mixtures of ammonia vapor and air will explode

when ignited. It has a lower explosive limit (LEL) of 15 percent, and an upper explosive limit (UEL) of 28 percent.

Health Hazards of Air Borne Ammonia Vapor. Airborne ammonia vapor is corrosive, highly toxic, and extremely irritating to any exposed tissues. Contact can cause severe burns of the skin or eyes. Exposure can cause headaches, loss of sense of smell, and nausea. Higher levels may irritate the lungs and cause coughing and/or shortness of breath. Very high exposures can cause pulmonary edema, which can lead to death.

With proper protection, the adverse effects of exposure to ammonia vapor can be reduced or eliminated. The threshold limit value (TLV) set by the American Conference of Governmental Industrial Hygienists (ACGIH) is 25 ppm (ACGIH, 1996). Exposure limits set by ACGIH, the National Institute for Occupational Safety and Health (NIOSH), and OSHA are listed in Table 8.12-4.

Other exposure limits include the Emergency Response Planning Guidelines (ERPG), developed by the American Industrial Hygiene Association (AIHA). ERPG Level 2 corresponds to the concentration that persons may be exposed to for up to an hour without suffering irreversible health effects. The U.S. EPA uses ERPG-2 as the toxic endpoint for RMP accident analyses; facilities with public receptors within a circle delineated by the toxic endpoint are required to develop a prevention program for the chemical process.

ERPG levels are shown in Table 8.12-5, along with other values that are considered by the CEC for siting purposes.

8.12.4 Offsite Consequence Analysis

This section presents an OCA and evaluation of potential acute public health impacts from an accidental release of acutely hazardous materials (AHMs). An evaluation of materials to be stored and used onsite was made against both the federal and state lists of AHMs regulated under the federal RMP and CalARP requirements. Both programs require an OCA if maximum storage quantities of regulated substances exceed threshold quantities. The only

material that may be stored and used onsite by the GWF Tracy Peaker Project in excess of the state threshold is aqueous ammonia for the SCR air pollution control system.

The OCA involves two accidental release scenarios. The first scenario is considered a "plausible" release scenario. The second scenario is considered a worst-case release and serves to determine which RMP Program Level would apply to the aqueous ammonia process. This is discussed further in Section 8.12.4.6.

8.12.4.1 Accidental Release Scenarios

One 9,000-gallon doubled-walled tank will store aqueous ammonia in a 29.5 percent concentration. Potential accidental release scenarios due to aqueous ammonia handling and use include losses from the storage tank, losses during truck unloading to the storage tanks, losses in the liquid ammonia delivery system from the storage tanks to the vaporizer, and losses of vaporized ammonia during delivery to the SCR catalyst beds. All of these portions of the ammonia storage and handling systems were evaluated. Because of safety shut-off systems associated with delivery of aqueous ammonia from the tanks to the vaporizer, and of ammonia vapor to the SCR, potential ammonia release quantities from these system components in the event of an upset condition are small compared to losses from the storage tanks or from truck unloading. The storage tank will be a double-walled tank. In the event of a failure of the inside tank wall, tank contents will be contained within the exterior tank wall. This "passive" mitigation system does not require any further mechanical systems to contain the tank contents. Since this passive mitigation will be in place and the probability of a double-wall rupture is extremely unlikely, the truck unloading accident was identified as the "worst-case" scenario. For the purposes of this assessment, the alternative ("plausible") release analysis also considered a truck unloading accident since mitigation for the storage tank will be passive, but under more "plausible" meteorological conditions.

The aqueous ammonia unloading station will be an engineered tank-truck unloading area, paved with reinforced, sealed concrete. The unloading area will slope to a center drain leading to an underground containment tank. The underground tank will be adequate to hold the entire contents of a single 6,700-gallon delivery truck plus a wash water allowance.

The worst-case release scenario involving truck unloading assumes that the truck contents will empty and drain into the underground tank. The release scenario is summarized as follows.

Ammonia Release Scenario. The accidental release occurs during truck unloading. The spilled aqueous ammonia splashes as it releases and drains to the underground containment vault, after which time ammonia will evaporate only through the 10-inch opening of the inlet drain. The resulting emissions release is assumed to last 60 minutes until the vault can be closed.

Release assumptions are summarized below. Release rates, which assume liquid temperatures that are 20°F above ambient temperatures, are summarized in Table 8.12-6. The ambient temperatures analyzed were 115°F (slightly higher than the 114°F maximum summertime temperature from a 41-year meteorological data record from Stockton [http://www.ncdc.gov/ol/climate/online/ccd]), 90°F (representative of average maximum temperatures), and 60°F (representative of the annual mean temperature of 61.6°F from a 30-year meteorological data record from Stockton). In comparison to these long-term values, the three-year meteorological data set (1997-1999) from Tracy yielded 105.5°F, 90.4°F, and 61.2°F as the maximum daily, maximum monthly average, and annual average temperatures, respectively. The assumption of the aqueous ammonia temperature inside the underground contaminant tank being 20°F above ambient provides for a conservative calculation of evaporation rate, since the liquid temperature inside the underground tank would not be expected to be this high.

Emissions due to evaporation of ammonia inside the containment tank were estimated from the following U.S. EPA model for evaporative emissions from a single-phase low volatility liquid (U.S. EPA 1993):

$$E = 6.94\times10^{-7}(1+0.0043\ (T_a - 273.15)^2)\ u_r^{0.75}\ A_p\ M\ (p_v/p_{vh})$$

where: E = emission rate (kg/s)

u_r = ambient wind speed at 10-m altitude (m/s)

T_a = ambient temperature (°K); here T_a must be greater than 273.15°K

A = pool area (m^2)

M = molecular weight (kg/kgmol)

p_v = vapor pressure of the chemical (Pa)

p_{vh} = vapor pressure of hydrazine at T_a (Pa)

The value for p_{vh} is given by:

$$p_{vh} = \exp[76.8580 - (7245.2/T_a) - 8.22\ln(T_a) + 0.006155T_a]$$

The predicted emissions are a function of the "pool area," ambient temperature, ambient wind speed, molecular weight of the liquid, and vapor pressure of the ammonia above the liquid. For the purposes of this emissions assessment, the "pool area" was set equal to the opening of the 10-inch-diameter drain. The assumption here is that evaporation of ammonia inside the underground containment tank is accounted for by ammonia vapor pressure and temperature, and that ambient wind speed accounts for convection of the ammonia vapor from the effective emissions area (the drain opening).

Example Calculation

Pool Surface Area:

Diameter = 10 inches = **0.0507 m^2**

Ambient Temperature of 115°F; Ammonia Temperature 135°F, Wind Speed of 1.0 m/s:

Vapor Pressure of 29.5% ammonia: **2,211 mm Hg (293,842 Pa**) at 135°F (interpolated from data in Perry's Chemical Engineer's Handbook, 5th Edition, Table 3-23, p.3-68).

Vapor Pressure of Hydrazine: **10,758 Pa** at 135°F (calculated from equation above)

$$E = [6.94\times10^{-7}(1+0.0043\ (\mathbf{330.37} - 273.15)^2)\ (\mathbf{1.0})^{0.75}\ (\mathbf{0.0507})\ (17)\ (\mathbf{293,842})/(\mathbf{10,758})]$$

= 0.0002464kg/s = **0.2464** g/s

8.12.4.2 Meteorological Conditions

Atmospheric dispersion modeling requires the input of various meteorological conditions. Low wind speeds and stable atmospheric conditions inhibit pollutant dispersion, resulting in higher pollutant concentrations. Higher wind speeds and/or neutral to unstable atmospheric conditions provide for better pollutant dispersion. The local three-year meteorological data from Tracy were used to determine the frequency distribution of wind speed and stability combinations. These data indicate that the most prevalent wind speeds are 1-2 m/s, occurring about 15.0 to 18.6 percent of the time. However, the most prevalent atmospheric stability is D (neutral), occurring 34.3 to 41.2 percent of the time, which would not be associated with 1-2 m/s winds. The next most prevalent wind speeds are 3-4 m/s, occurring 13.8 to15.6 percent of the time, while wind speeds of 2-3 m/s and 4-5 m/s comprise a total of another 19.4 to 22.4 percent of the time. These wind speeds of 2-5 m/s (occuring about 33.2 to 38.0 percent of the time) are more associated with neutral to unstable atmospheric conditions. Therefore, a wind speed of 3.5 m/s and D atmospheric stability represents plausible "alternative" meteorology for the project area in terms of reasonable average conditions.

The U.S. EPA requires that worst-case OCA modeling be performed assuming a wind speed of 1.5 meters per second with a stability class of F (stable) (U.S. EPA 1998). This meteorological condition will generally result in overpredictive (conservative) concentrations. For the GWF Tracy Peaker Project, worst-case modeling was performed with a wind speed of 1.0 m/s and F stability to provide even more conservatism. The "alternative" meteorological analysis used a stability class of D and a wind speed of 3.5 meters per second. Three ambient temperatures were used to assess potential impacts: 60°F, 90°F, and 115°F (the latter temperature being representative of extreme summer conditions used in the worst-case analysis; the "alternative" meteorological analysis used the average maximum summer time temperature of 90°F).

8.12.4.3 Endpoints

The OCA establishes an impact zone or a zone of vulnerability that depends upon the "endpoint." The endpoint corresponds to a concentration that is associated with a certain health effect. Any receptors between the source and this endpoint (i.e., within the impact zone) could experience the specified health effect. The four endpoints specified for the OCA are 75 ppm, 200 ppm, 300 ppm, and 2,000 ppm. See Section 8.12.3 for a discussion of the health effects associated with these concentrations.

8.12.4.4 Atmospheric Dispersion Modeling

Atmospheric dispersion modeling was performed to estimate downwind concentrations of ammonia for the hypothetical release scenario discussed in Section 8.12.4.1. The dispersion modeling provided a conservative estimate of the zone of vulnerability (the maximum downwind distance at which a specific level of concern may potentially be exceeded).

The atmospheric dispersion modeling used the U.S. EPA -approved SCREEN3 dispersion model, Version 96043 (USEPA 1995). SCREEN3 is a Gaussian steady-state dispersion model that can calculate potential ground-level air pollutant concentrations from either a point or area source. It is considered a screening-level model in that it predicts air pollutant concentrations based on 10-minute-average dispersion factors (which are conservatively taken to represent up to 1-hour concentrations) under either: (1) a prescribed wind speed-stability class combination or (2) an assumed array of potential wind speed-stability class combinations, reporting the maximum predicted concentrations at any downwind distance under any of the meteorological conditions in the array. Ammonia vapor is lighter than air. Therefore, emissions associated with the evaporating ammonia would mix rapidly with the surrounding air and result in a neutrally buoyant plume. The area source for these runs was taken to be the area of the 10-inch drain opening to the underground containment tank.

8.12.4.5 Discussion of OCA Results

The SCREEN3 model provides concentration outputs with respect to distance from the release location. The radii of influence (distance from the source) to the four identified

LOCs (75 ppm, 200 ppm, 300 ppm, and 2,000 ppm) for the different meteorological conditions are summarized in Table 8.12-7. Figures 8.12-3, 8.12-4, and 8.12-5 are graphs that show concentrations of ammonia as they decrease with distance for the ambient temperatures of 115°F, 90°F, and 60°F, respectively. Figure 8.12-6 illustrates the radii of influence for the worst-case wind speed-stability class combination at 115°F ambient temperature (worst-case meteorology), and Figure 8.12-7 shows the radii of influence for the annual average wind speed-stability combination at 90°F ambient temperature (alternative-case meteorology). The circles shown on Figures 8.12-6 and 8.12-7 indicate the radii of influence equal to the maximum downwind distances corresponding to the concentration of ammonia modeled. Dispersion modeling files can be found in Appendix F.

Even under worst-case meteorological conditions (F stability, 1-m/s wind speed, 115° F), concentrations of ammonia from the GWF Tracy Peaker Project site are estimated to fall below 75 parts per million (ppm) approximately 36.30 meters (119 feet) from the truck unloading area, which would not go offsite. Under alternative-case meteorology (D stability, 3.5-m/s wind speed, 90°F), the distance to 75 ppm falls to 12.55 meters (41 feet) from the truck unloading area.

It is important to note that this offsite consequence analysis is ultraconservative. For example, the worst-case meteorology used in the analysis of an ambient temperature of 115°F, F stability, and 1-m/s winds would not realistically occur simultaneously. Under actual typical conditions, stable atmospheres and low winds are associated with nighttime and morning conditions, when ambient temperatures are not expected to be this high.

In summary, no significant offsite public health consequences due to an ammonia release are expected to occur, based on the results of the OCA. Power plant workers in the vicinity of the aqueous ammonia truck unloading area could be exposed to harmful concentrations of ammonia in the unlikely event of an accidental ammonia release, and may need to take protective action upon detection of ammonia odors. The proposed project design includes measures to reduce the likelihood and consequences of an accidental aqueous ammonia release. As discussed in Section 8.7 (Worker Safety), workers at the GWF Tracy Peaker facility would be trained to avoid and respond to accidental releases of hazardous materials, including aqueous ammonia. A delivery

checklist will be used whenever ammonia is delivered reminding operators to shut the valves on the vapor return line after delivery. The mechanical integrity program will ensure that the check valve on the vapor return line is regularly tested and inspected and replaced at prescribed intervals. Limited personal protective equipment will be available in a specified location in the event they are required by emergency response personnel to approach the tank and stop the release. These systems will also be inspected and tested at prescribed intervals.

8.12.4.6 RMP Program Level

Under both the U.S. EPA and California RMP requirements, there are three Program Levels. The proposed aqueous ammonia system will require an RMP to satisfy California (CalARP) requirements. The quantity of aqueous ammonia on site is below the federal Program Level. CalARP regulations define Program Levels in accordance to the California regulations at CCR 25531. Processes qualify for the lowest Program 1 Level if:

- There are no public receptors within a distance to an endpoint from a worst-case release.
- The facility has coordinated emergency response activities with local responders.
- The process has had no release of a regulated substance in the past five years that resulted in one or more offsite deaths, injuries, or response or restoration activities.

The GWF Tracy Peaker Project will coordinate emergency response activities with local responders, and as a newly proposed facility, there is no offsite accident history. The remaining Program Level 1 qualification is whether there are public receptors within a distance to endpoint from a worst-case release. Under federal regulations, the toxic endpoint for ammonia is the ERPG-2 level of 200 ppm. The distance to 200 ppm under worst-case meteorology is 20.77 meters (68 feet) from the truck unloading area, which does not go offsite. Thus, there are no public receptors within the offsite distance to ERPG-2, and the GWF Tracy Peaker Project is therefore eligible for Program 1 status under CalARP regulations pursuant to CCR 25531.

8.12.5 Fire and Explosion Risk

As shown in Tables 8.12-1 and 8.12-3, several materials that would be used and/or stored on site during operation of the proposed TPP are flammable. The following discussion focuses on the fire and explosion risk posed by lubricating oils and natural gas. These materials are considered to pose a greater risk than the other flammable substances, either because they are handled in large quantities (lubricating oils) or because they have a National Fire Protection Association (NFPA) fire rating of 4 (natural gas). The NFPA 4 rating is used only for substances that pose an extreme fire or explosion risk.

8.12.5.1 Lubricating Oils

Approximately 20,000 gallons of insulating oil would be used in the transformers at the TPP. A total of 1,700 gallons of lubricating oil would be used in rotating equipment and stored on site. The flashpoints of mineral oil and lubricating oil are 444 °F and 315–366 °F, respectively (Sax, 1992). NFPA assigns lubricating oils a fire hazard rating of 1, meaning that the materials "must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur" (NFPA, 1991).

Because an external event, such as a fire, could preheat these materials to the point of ignition, fire suppression equipment will be available near the transformers and the lubricating oil storage area. As an additional mitigation measure, no mineral insulating oil will be stored on site.

8.12.5.2 Natural Gas

Natural gas has an NFPA rating of 4. The main component of natural gas, methane, is regulated under the RMP and the CalARP when used in processes in excess of 10,000 pounds. Natural gas would not be stored on site, but would be used from the pipeline supplying gas to the facility. Therefore, the quantity of natural gas on site is below the RMP and CalARP thresholds. Therefore, natural gas would not be regulated under RMP or CalARP

requirements. Approximately 24,000 million British thermal units (MMBtu) would be required at the TPP on a daily basis.

Natural gas would be delivered from the existing onsite PG&E natural gas pipeline. A short onsite pipeline would connect the PG&E natural gas pipeline to the project natural gas piping. An analysis of natural gas pipeline safety was conducted in 1993 and 1994 by the Sacramento Municipal Utility District and Woodward-Clyde, respectively (Woodward-Clyde, 1998). This safety analysis studied the incremental individual fatality risk per mile of 800 new miles of natural gas pipeline to be constructed in California. The results of this study indicated that the risk associated with the new pipeline was much lower than that for fires, earthquakes, electrocution, and lightning strikes in California. These conclusions can be applied to the pipeline proposed for the TPP.

8.12.6 Proposed Mitigation Measures

As discussed throughout this section, the proposed TPP will implement numerous accident prevention and mitigation measures to reduce the risk associated with the usage and storage of hazardous materials. Risk is a function of both the likelihood of a release and the consequences of a release. Although risk cannot be completely eliminated, the engineering and procedural features of the TPP would effectively reduce the possibility and potential consequences of a release.

The key prevention and mitigation features of the TPP include:

- Construction and operations personnel will be trained in safety and defensive emergency response procedures.
- Storage quantities of all hazardous materials will be minimized and substitution of nonhazardous materials for hazardous materials will be implemented at the TPP to the extent practicable.
- Incompatible materials will be stored in separate, bermed or otherwise secondarily contained areas.
- Piping and tanks will be protected from potential traffic hazards by vehicle barriers.

- Personnel will be trained in the hazards of the materials they handle and in preventing accidents.
- Personnel will be trained in the use of fire suppression equipment, evacuation, notification, and other defensive emergency response procedures.
- Information on fire suppression equipment is provided in Section 8.7.3.2 of this AFC.

The following aqueous-ammonia process prevention and mitigation measures will be implemented:

- To prevent incidents associated with ammonia delivery, a trained TPP operator will be present at all times during delivery of aqueous ammonia and will follow a checklist of unloading procedures.
- The mechanical integrity program will ensure that all valves in the ammonia process are regularly tested and inspected and replaced at prescribed intervals.
- Personal protective equipment, consisting of, but not limited to, goggles/faceshields, splash suits, and rubber boots, will be available in a specified location in the event they are required by emergency response personnel to approach the tank truck and stop a release.

Additional accident prevention measures are mandated by various regulations. These measures are discussed below.

8.12.6.1 Transportation/Delivery of Hazardous Materials

Hazardous materials would be delivered to the TPP site periodically. Transportation of these materials will comply with all applicable regulations of the U.S. Department of Transportation, U.S. EPA, California Department of Toxic Substances Control, California Highway Patrol, and California State Fire Marshal. Transportation of aqueous ammonia will comply with the specific regulations in the California Vehicle Code Section 32100.5 regarding materials that pose an inhalation hazard.

8.12.6.2 Hazardous Materials Business Plan

A HMBP will be prepared prior to delivery of specified hazardous materials to the TPP in conformance with Title 19 of the California Code of Regulations and Health and Safety Code Section 25504. The HMBP requires facilities to develop the following information:

- Facility map showing locations of hazardous materials and emergency response equipment
- Hazardous materials inventory, including material safety data sheets (MSDS)
- Emergency contact information
- Emergency response plans and procedures
- Emergency notification procedures
- Emergency response training for all employees

8.12.6.3 Risk Management Plan

An RMP will be prepared in conformance with the requirements of the local AA (San Joaquin County DEH) for any regulated substance stored in a process in excess of its threshold quantity. An RMP will be prepared for aqueous ammonia prior to ammonia delivery to the TPP to meet Program Level 1 requirements. This RMP must include:

- Offsite Consequence Analysis (or Hazard Assessment)
- Emergency Response Program

8.12.6.4 Spill Prevention, Control, and Countermeasure Plan

The SPCC Plan will be prepared in accordance with federal and California regulations. This plan must be prepared if petroleum products stored on site in aboveground storage tanks with a capacity that equals or exceeds 660 gallons for a single tank, or equals or exceeds 1,320 gallons for more than one tank. The SPCC Plan must be prepared prior to delivery of petroleum products to the site. The SPCC Plan will include information on spill response procedures and fuel storage.

8.12.6.5 Material Safety Data Sheets

Hazardous material MSDSs will be kept on site as required by OSHA's Hazard Communication Standard, 29 CRF 1910.1200.

8.12.6.6 Monitoring

An extensive monitoring program is not required, as the environmental and human health effects are expected to be minimal during both the construction and the operations and maintenance phases of the TPP. A variety of auditing and inspection requirements will help to ensure that the proposed measures effectively mitigate the risks associated with hazardous materials.

8.12.7 Indirect/Cumulative Impacts

8.12.7.1 Potential Indirect Effects of the TPP

The implementation of the TPP would support additional development local area. Increased development could result in the increased transport and use of hazardous materials. However, no specific projects have been identified, and any projections of additional hazardous material transport and use would be speculative. Because the TPP is located in an area of industrial and agricultural use, these increases in the transport and use of hazardous materials are not expected to have significant impacts in the local area.

8.12.7.2 Potential for Cumulative Impacts

In accordance with the requirements of the California Environmental Quality Act (CEQA), this analysis must consider the potential cumulative impacts on existing public receptors and future residential development that would be affected by the proposed facilities, related facilities, and other planned and foreseeable future projects in the site vicinity. The following discussion summarizes the information available on projects that may have cumulative impacts with the TPP.

In San Joaquin County, projects with related environmental impacts could include other cogeneration projects, other power projects, and other projects associated with the

surrounding. The construction of the TPP at a location adjacent to the existing GWF facility would increase the local usage of hazardous materials. No additional RMP requirements would be triggered by the construction of the new facility as a result of the combined chemical usage. Therefore, no significant cumulative impacts associated with hazardous materials are expected from the TPP.

8.12.8 Involved Agencies and Contacts

Agency	Requirement	Contact/Title	Telephone
Regional Water Quality Control Board, 3443 Routier Road, Suite A Sacramento, California 95827	SPCC	Jim Marshall	916-255-3000
San Joaquin County Office of Emergency Services	CalARP/HMBP	Mike Parissi	209-468-3969

The extent of involvement, if any, by government agencies and/or private organizations in emergencies would depend on the type and magnitude of an incident. Table 8.12-8 identifies government agency and other organizational involvement by type of incident. Table 8.12-9 identifies organizational roles for incidents that involve hazardous materials.

The TPP would use local emergency services in case of emergency. The City of Tracy Fire Department would be informed of the layout of the TPP and the potential hazards associated with its operations through the submission of a HMBP. The City of Tracy Fire Department already has on file a copy of the HMBP for the adjacent existing GWF facility. The HMBP includes GWF's Hazardous Materials Inventory Statement. The HMBP, hazardous materials inventory, and site map would be modified as necessary for the TPP and kept secured in a fire department box at the front gate of the combined GWF facilities. On request, any of the emergency service agencies would be given MSDSs for chemicals used in the facility. These sheets would be updated as new MSDSs are developed or revised, or as more information on these chemicals is made available.

8.12.9 Required Permits

There are no permits required for storage and use of the planned hazardous materials.

8.12.10 Summary Table of Laws, Ordinances, Regulations, and Standards

Table 8.12-10 lists applicable LORS. Proposed conditions of certification are contained in Appendix K. These conditions are proposed in order to ensure compliance with applicable LORS and/or to reduce potentially significant impacts to less-than-significant levels.

8.12.11 References

ACGIH, 1996. Documentation of the Threshold Limit Values and Biological Exposure Indices. American Conference of Governmental Industrial Hygienists, Cincinnati, Ohio.

NFPA, 1991. Fire Protection Guide on Hazardous Materials. Tenth Edition. National Fire Protection Association, Quincy, Mass.

San Joaquin County Department of Environmental Health, 2001. Personal communication with Joe Morgan, URS, July.

San Joaquin County Office of Emergency Services, 2001. Personal communication with Joe Morgan, URS, July.

Sax, 1992. Sax's Dangerous Properties of Industrial Materials. Eighth Edition. Edited by Richard J. Lewis, Sr. New York: Van Nostrand Reinhold.

Sutter Tracy Hospital, 2001. Personal communication with Joe Morgan, URS, July.

Tyler, 1998. Personal communication between Rick Tyler, CEC, and Deborah Pansius, Radian International. 2 October.

U.S. EPA, 1998. General Guidance for Risk Management Programs (40 CFR Part 68). EPA 550-B-98-003. July.

U.S. EPA, 1995. SCREEN3 Model User's Guide. EPA 454/B-95-004. September.

U.S. EPA, 1993. Guidance on the Application of Refined Dispersion Models to Hazardous/Toxic Air Pollutant Releases. EPA-454/R-93-002. April 30.

Woodward-Clyde, 1998. Application for Certification: La Paloma Generating Project. Submitted to the California Energy Commission. Docket 98-AFC-2. July 10.

Wray, Thomas, 1991. "HazMat Chemist, Ammonia." HazMat World, D 86, November.

TABLES

Table 8.12-1
Hazardous Materials Used During the Construction Phase

Material	Maximum On-Site Quantity	Use	Hazards[1]	Storage Type/Area
Fuels				
Unleaded gasoline	2,000 gallons	Fuel for construction equipment	Acute, chronic, fire	Equipment service vehicle tanks
Diesel fuel	2,000 gallons	Fuel for construction equipment	Acute, chronic, fire	Equipment service vehicle tanks
Lubricants				
Turbine oil, maintenance	55–110 gallons	Lubricating oil for CTs	Acute, chronic, fire	Equipment service vehicle tanks
Turbine oil, filling operation	5,000 gallons, short term, 1 day	Lubricating oil for CTs	Acute, chronic, fire	Tank Truck delivery
Motor oils	20–30 gallons	Lubricating oil for construction equipment and vehicles	Acute, chronic, fire	Equipment service vehicle tanks
Hydraulic oils	40–50 gallons	Hydraulic construction equipment	Acute, chronic, fire	Equipment service vehicle tanks
Various greases	< 25 gallons	Lubricants for construction equipment and permanent plant equipment including motors, pumps, valves, etc.	Acute, chronic, fire	Original shipping containers, equipment service vehicle
Solvents				
WD-40, similar solvents	2–3 gallons	Grease remover	Acute, chronic, fire	Original shipping containers, construction warehouse
Methyl ethyl ketone	< 25 gallons	Solvent and cleaner	Acute, chronic, fire, reactive	Original shipping containers, construction warehouse
PVC pipe joint cement	5–10 gallons	Solvent based joint cement for assembly of PVC piping	Acute, chronic, fire	Original shipping containers, construction warehouse
PVC pipe cleaner	10–20 gallons	Solvent to clean PVC pipe joints prior to completing pipe joint welding (epoxy)	Acute, chronic, fire	Original shipping containers, construction warehouse

Table 8.12-1 (continued)
Hazardous Materials Used During the Construction Phase

Material	Maximum On-Site Quantity	Use	Hazards	Storage Type/Area
Paints				
Paint, miscellaneous	10–20 gallons	Paint for touch-up painting of construction equipment and buildings	Acute, chronic	Original shipping containers, construction warehouse
Paint	400–500 gallons	Permanent structures paint	Acute, chronic	Original shipping containers, construction warehouse
Paint thinner, miscellaneous	5–10 gallons	Thinner for touch-up paint	Acute, chronic, fire, reactive	Original shipping containers, construction warehouse
Paint thinner	200–300 gallons	Thinner for structures paint	Acute, chronic, fire, reactive	Original shipping containers, construction warehouse
Aerosol paint	40–50 12-ounce cans	Touch-up paint or marking paint	Acute, chronic, fire, pressure	Original shipping containers, construction warehouse
Miscellaneous				
Concrete curing agents	25–30 gallons	Curing agent applied to surface of freshly poured concrete to aid in proper curing	Acute, chronic, fire	Original shipping containers, construction warehouse
Concrete form release agents	25–30 gallons	Agent sprayed on concrete forms prior to placement of concrete so forms can be stripped after concrete sets	Acute chronic fire	Original shipping containers, construction warehouse
Epoxy Resins				
Epoxy type grout material	5–10 gallons	Epoxy based grout material for grouting of equipment	Fire	Original shipping containers construction warehouse
Concrete anchor epoxy	100–200 epoxy-filled 4–6 ounce glass vials	Combination epoxy and hardener agents in glass vials used for bonding anchor bolts	Fire	Original shipping containers, construction warehouse

[1] Hazard categories are defined by 40 CFR 370.2. Health hazards include acute (immediate) and chronic (delayed). Physical categories include fire, sudden release of pressure, and reactive.
CFR = Code of Federal Regulations
CT = combustion turbine
PVC = polyvinyl chloride

Table 8.12-2
Hazardous Materials Used During the Operations and Maintenance Phase

Chemical Name	Quantity	State	Location	Delivery Freq.	Use
CTG Lube & Hydraulic Oil	7,400 gal	L	6	1x/10 years	Lubrication
CTG Water-wash Soap	100 gal	L	8	1x/year	CTG Cleaning
CTG Step-up Xfrmr Oil	9,000 gal	L	12	1x/10 years	Xfrmr Insulation
Liquid Carbon Dioxide	3,200 lb	L	16	1x/year	Fire Suppression
Carbon Dioxide	725 lb	G	64	1x/10 years	Fire Suppression
Nitrogen	20,000 cf	G	23	2x/year	CEMS
Nitric Oxide (5 ppm)	800 cf	G	23	4x/year	CEMS
Carbon Monoxide (15 ppm)	550 cf	G	23	4x/year	CEMS
STG Lube Oil	1,550 gal	L	34	1x/10 years	Lubrication
STG Hydraulic Oil	150 gal	L	36	1x/10 years	Lubrication
Diesel Fuel in EG	250 gal	L	37	1x/year	Emergency Power
STG Step-up Xfrmr Oil	6,000 gal	L	38	1x/10 years	Xfrmr Insulation
Aqueous Ammonia	9,000 gal	L	17	1x/4 days	NO_x Control
115-kV/4,160V Xfrmr Oil	2,000 gal	L	62	1x/10 years	Xfrmr Insulation
4,160V/480V Xfrmr Oil	3,000 gal	L	62	1x/10 years	Xfrmr Insulation

*Water treatment chemicals (mainly by Nalco) would be delivered as needed. One Nalco delivery is expected each month; however, not all water treatment chemicals will be delivered each month.

Note: The location numbers correspond to the plant arrangement drawing (63992-SK-M1005) by Black & Veatch (see Figure 8.12-1).

cf = cubic feet
CEMS = continuous emissions monitoring system
CTG = combustion turbine generator
EG = emergency generator
G = gas
gal = gallons
L = liquid
lb = pounds
STG = steam turbine generator
Xfrmr = transformer
V = volts

Table 8.12-3. Characteristics of the Hazardous Materials Used During the Operations and Maintenance Phase

Material	CAS Number	Maximum Onsite Quantity	Hazards	Phase	CalARP Threshold Quantity
CTG Lube & Hydraulic Oil	None	7,400 gal.	Fire, acute	Liquid	N/A
CTG Water-wash Soap	None	100 gal.	Acute	Liquid	N/A
CTG Step-up Transformer Oil	64742-53-6	9,000 gal	Fire, acute	Liquid	N/A
Liquid Carbon Dioxide	124-38-9	10,000 lb	Pressure, acute	Liquid	N/A
Nitrogen	7727-37-9	280 cf	Pressure, acute	Gas	N/A
Nitric Oxide (5 ppm)	10102-43-9	280cf	Pressure, acute	Gas	100 lb
Carbon Monoxide (15 ppm)	630-08-0	280 cf	Pressure, acute	Gas	N/A
STG Lube Oil	None	1,550 gal	Fire, acute	Liquid	N/A
STG Hydraulic Oil	None	150 gal	Fire, acute	Liquid	N/A
Diesel Fuel in EG	6847-3-6	150 gal	Fire, acute	Liquid	N/A
Reverse Osmosis Antiscalant	Mixture	50 gal	unknown	Liquid	N/A
Sodium Hydroxide, 50%	1310-73-2	50 gal	Corrosive	Liquid	N/A
Aluminum Sulfate, 46%	10043-01-3	50 gal	Corrosive	Liquid	N/A
Aqueous Ammonia	7664-41-7	165,000 lb	Acute, reactive	Liquid	500 lb
115-kV/4160V Transformer Oil	None	2,000 gal	Fire, acute	Liquid	N/A
4,160V/480V Transformer Oil	None	3,000 gal	Fire, acute	Liquid	N/A

CalARP = California Accidental Release Prevention
CAS = Chemical Abstract Service
cf = cubic feet
CTG = combustion turbine generator
EG = emergency generator
gal = gallons
lb = pounds
N/A = not applicable
ppm = parts per million
STG = steam turbine generator
V = volts

Table 8.12-4
Occupational Exposure Limits for Airborne Ammonia Vapor

Agency	Name	Value (ppm)
NIOSH	Recommended Exposure Limit (REL)[1]	25
NIOSH	Recommended Exposure Limit, Ceiling (REL CL)[2]	50
NIOSH	Short-Term Exposure Limit (STEL)[3]	35
OSHA	Permissible Exposure Limit (PEL)[4]	50
OSHA	Short-Term Exposure Limit (STEL)[5]	35
ACGIH	Short-Term Exposure Limit (STEL)[6]	35
ACGIH	Permissible Exposure Limit (PEL)[7]	25
ACGIH	Threshold Limit Value (TLV)[8]	25

[1] Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek.
[2] Concentration that should not be exceeded at any time.
[3] Time-weighted average concentration for 15 minutes that should not be exceeded at any time during a workday.
[4] Time-weighted average concentration that must not be exceeded during any eight-hour work shift of a 40-hour workweek.
[5] Time-weighted average concentration for 15 minutes that must not be exceeded at any time during a workday.
[6] Recommended time-weighted average concentration for 15 minutes that should not be exceeded at any time during a workday.
[7] Recommended time weighted average concentration that must not be exceeded during any eight-hour work shift of a 40-hour workweek.
[8] Airborne concentration under which it is believed that nearly all workers may be repeatedly exposed without adverse health effects.

ACGIH = American Conference of Governmental Industrial Hygienists
NIOSH = National Institute for Occupational Safety and Health
OSHA = Occupational Safety and Health Administration
ppm = parts per million

Table 8.12-5
Other Exposure Limits for Ammonia Vapor

Agency/Source	Name	Value (ppm)
AIHA	Emergency Response Guideline (ERPG) Level 1[1]	25
NRC[2]	STPEL	75
AIHA	ERPG-2[3]	200
NIOSH	Immediately Dangerous to Life and Health (IDLH)[4]	300
AIHA	ERPG-3[5]	1,000
Wray, 1991	Lethality Level[6]	2,000

[1] The ERPG-1 corresponds to the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing other than mild, transient adverse health effects or perceiving a clearly defined objectionable odor.
[2] The Short-Term Public Emergency Limit (STPEL) was developed by the National Research Council (NRC). The STPEL is considered the significance level by CEQA and the CEC (Tyler, 1998).
[3] The ERPG-2 corresponds to the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action.
[4] Maximum concentration exposure of up to 30-minute duration from which a worker could escape without loss of life or irreversible health effects.
[5] The ERPG-3 corresponds to the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects.
[6] The human lethality value of ammonia over a 30-minute averaging time.

AIHA = American Industrial Hygiene Association
NIOSH = National Institute for Occupational Safety and Health
ppm = parts per million

Table 8.12-6
Accidental Release Scenario Release Rates And Meteorological Conditions

Ambient Temperature (°F)	Wind Speed (m/s)	Stability Class[1]	Assumed Liquid Temperature (°F)[2]	Release Rate (kg/s)
60	1.0	F	80	0.0001139
60	3.5	D	80	0.0002916
90	1.0	F	110	0.0001866
90	3.5	D	110	0.0004775
115	1.0	F	135	0.0002464
115	3.5	D	135	0.0006304

[1] Stability classes: F (Stable conditions)
D (Neutral conditions)

[2] Released aqueous ammonia assumed to be 20°F higher for conservative calculation of evaporation rate.

Table 8.12-7
Dispersion Modeling Results

Ambient Temperature (°F)	Wind Speed (m/s)	Stability Class[1]	Distance to Various Levels of Concern (m)[2]			
			2000 ppm	300 ppm	200 ppm	75 ppm
60	1.0	F	3.11	9.96	12.96	22.21
60	3.5	D	------[3]	4.46	5.29	9.38
90	1.0	F	4.60	13.94	17.48	30.10
90	3.5	D	1.45	5.99	7.80	12.55
115	1.0	F	5.76	16.63	20.77	36.30
115	3.5	D	2.20	7.45	9.02	14.63

[1] Stability classes are defined as follows: D = neutral conditions; F = stable conditions.

[2] Refer to Figures 8.12-3, 8.12-4, and 8.12-5 for graphical representations of ammonia concentrations under the modeling scenarios.

[3] The SCREEN3 Model did not calculate ammonia concentrations this high.

Table 8.12-8
Involvement of Government Agencies and Other Organizations by Type of Incident

Organization	Emergency Phone #	Fire	Spill	Security	Medical	Technical Assistance	Other
City of Tracy Fire Department	911	X	X	X	X	X	X
Emergency Medical Services	911	X	X		X		
Police Department	911			X			
California Highway Patrol	911		X[a]				
Sutter Tracy Community Hospital	911				X	X	
San Joaquin Valley Unified Air Pollution Control District	(559) 497-1000		X			X	
Central Valley Regional Water Quality Control Board	(916) 255-3000		X			X	X
San Joaquin County Office of Emergency Services	(209) 468-3969		X		X	X	
California EPA; Department of Toxic Substances Control	(510) 540-2122		X		X	X	
California Office of Emergency Services	(800) 852-7550	X	X		X	X	X
California Department of Fish & Game	(707) 944-5512		X[b]				
U.S. EPA National Response Center	(800) 424-8802		X[b]			X	
U.S. Department of Transportation	(415) 280-4897		X[a]			X	
U.S. Coast Guard	(415) 556-2103		X[b]			X	
M. P. Vacuum Services	(800) 458-3036 (805) 393-1151		X[b]			X	
Poison Control Center	(800) 876-4766		X		X	X	
PG&E	(800) 743-5000						X
Southern California Gas Company							X

[a] If spill is on highway.
[b] If spill is into waterways or sewer.
EHS = Environmental Health and Safety
EPA = Environmental Protection Agency

Table 8.12-9
Organizational Roles for Incidents That Involve Hazardous Materials

Agency	Role
Fire Department	Lead agency for all life-safety issues (e.g., fire, explosion, injury or illness, chemical release); assistance in initial care of victims.
Emergency Medical Services	Lead agency for medical operations and primary care and transport of victims.
Police Department	Lead agency for security-related emergencies (e.g., bomb threat, sabotage, civil disturbance, etc.); maintains order in emergencies involving community evacuations; expedites the movement of vehicles; California Highway Patrol must be notified of violations of hazardous materials transportation regulations or hazardous materials releases onto highways.
Water District/ Sanitation District	Required to be notified in the event of a discharge of hazardous materials to the sanitary sewer system or storm drain.
Sutter Tracy Community Hospital	Receives and treats injury and illness victims, can provide technical assistance for first aid and basic life support or other issues
San Joaquin County Department of Public Health, Division of Environmental Health Services, Office of Emergency Services	Regulates hazardous waste regulations for hazardous waste generators; must be notified of hazardous waste incidents; must be notified of any sanitary concerns (e.g., food poisoning, epidemics, etc.).
San Joaquin Valley Unified Air Pollution Control District	Must be notified of any unauthorized discharges of or hazardous materials to the atmosphere.
Regional Water Quality Control Board - Central Valley	Must be notified of any unauthorized discharges of hazardous materials into the soil, groundwater, or surface water.
California EPA; Department of Toxic Substances Control	Must be notified of any unauthorized discharges of hazardous materials to the environment; can provide technical assistance for toxicology issues
California Office of Emergency Services	Must be notified of any life threatening releases of hazardous materials into the environment; acts as the lead agency in coordinating responses to large-scale emergencies and regional disasters.

Table 8.12-9 (continued)
Organizational Roles for Incidents That Involve Hazardous Materials

Agency	Role
California Department of Fish and Game	Must be notified of any discharges of hazardous materials into surface waters.
U.S. EPA	Overall regulation of environmental laws; must be notified about discharges of hazardous materials in excess of reportable quantities; must be notified of discharges of oil.
U.S. Department of Transportation	Regulates the transportation of hazardous materials on public roads.
U.S. Coast Guard	Must be notified of hazardous materials releases into navigable waters.
M. P. Vacuum Services or CET Environmental	Provides assistance in removal and transportation of hazardous material spills.
Phillips Services	Provides assistance in removal and transportation of hazardous materials spills when CET Environmental is not available.
Poison Control Center	Provides information regarding the ingestion or inhalation of poisonous chemicals.
PG&E	Must be notified in the event of a power failure. Provides assistance if electrical services are temporarily unavailable.
Southern California Gas	Must be notified in case of a gas leak. Provides assistance if gas services are temporarily unavailable.

Table 8.12-10
Summary of Laws, Ordinances, Regulations, and Standards Applicable to Hazardous Waste Handling

Authority	Administering Agency	Requirements & Compliance	Jurisdiction	AFC Section
CERCLA, as amended by SARA; Title III, Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986, 42 USC 11001 et seq.; 40 CFR Parts 302, 355, 370, and 372.	U.S. EPA Region IX; National Response Center; California Office of Emergency Services (OES); San Joaquin County Office of Emergency Services	Project will comply with CERCLA, release notification requirements; SARA Title III, reporting requirements for storing, handling, or producing regulated substances.	Federal	8.12.3 and 8.12.6
29 CFR 1910 et seq. 29 CFR 1926 et seq.	Occupational Safety and Health Administration (OSHA)	Project will comply with requirements pertaining to employers whose employees handle hazardous materials and extremely hazardous chemicals.	Federal	8.12.6
Clean Air Act Amendments of 1990, Section 112(r), Accidental Release Prevention Program, 42 USC 7412 (r), 40 CFR Part 68	U.S. EPA Region IX; California OES; San Joaquin County	Project will comply with requirements pertaining to risk management of regulated substances.	Federal	8.12.3.3, 8.12.4, and 8.12.6
Clean Water Act, Spill Prevention, Control, and Countermeasure Plan, 40 CFR 112	U.S. EPA Region IX, California Central Valley Regional Water Quality Control Board	Project will comply with requirements designed to prevent the discharge of oil into navigable waters.	Federal	8.12.6.4
California Health & Safety Code §§ 25500–25520; 19 CCR §§ 2720–2734	San Joaquin County Office of Emergency Services	Project will prepare a Hazardous Materials Business Plan (HMBP).	State	8.12.6
California Accidental Release Prevention (CalARP) Program, California Health & Safety Code § 25531 et seq., 19 CCR Division 2, Chapter 4.5	California OES, San Joaquin County Office of Emergency Services	HMBP requirements.	State	8.12.6
8 CCR § 339, § 3200 et seq., 5139 et seq., 5160 et seq., 5189 et seq.	Cal-OSHA	Project will meet requirements pertaining to the control and management of hazardous substances.	State	8.12.3 and 8.12.6

Table 8.12-10 (continued)
Summary of Laws, Ordinances, Regulations, and Standards Applicable to Hazardous Waste Handling

Authority	Administering Agency	Requirements & Compliance	Jurisdiction	AFC Section
Uniform Fire Code, Article 80 and others	City of Tracy Fire Department	Project will meet provisions regarding fire protection and neutralization systems for hazardous materials.	State	8.12.8 and 8.12.9
State Building Code	Various agencies	Project will meet requirements pertaining to fire prevention, building safety, etc.	Industry	8.12.8 and 8.12.9
California Vehicle Code 31300 et seq.	Caltrans	Project will comply with requirements for transportation of hazardous materials on state highways.	Industry	8.12.3.1, 8.12.3.2, and 8.12.6.1

CCR = California Code of Regulations
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR = Code of Federal Regulations
EPA = Environmental Protection Agency
SARA = Superfund Amendments and Reauthorization Act of 1986
AFC = Application for Certification
USC = United States Code

FIGURES

Figure 8.12-1. Location of Hazardous Materials at the GWF TPP

Figure 8.12-2. Aqueous Ammonia System P&ID

Figure 8.12-3. Alternative Release Scenario Impact Zone–200 ppm Endpoint

Figure 8.12-4. Worst-Case Scenario Impact Zone–200 ppm Endpoint